



Pima Community College's Pathways to Healthcare Program

Supplementary Appendix on Program Costs (Appendix I)

OPRE Report 2020-43



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PACE
Pathways for Advancing
Careers and Education

Pima Community College's Pathways to Healthcare Program: Supplementary Appendix on Program Costs (Appendix I)

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Samuel Dastrup and Kimberly Burnett, Abt Associates

Submitted to:

Nicole Constance and Amelia Popham, Project Officers

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Project Director: Larry Buron

Abt Associates Inc.

6130 Executive Blvd.

Rockville, MD 20852

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¹ The main Pathways to Healthcare appendices (Judkins et al. 2020) were published in March 2020.

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Appendix I: Costs of Pathways to Healthcare Program

Pima Community College (PCC) and Pima County One-Stop (PCOS) in Tucson, Arizona, implemented the **Pathways to Healthcare** program to help low-income, low-skilled adults access and complete healthcare occupational training that could lead to increased healthcare employment and higher earnings. In doing so, PCC also aimed to address expected labor shortages in healthcare occupations in the Tucson area.

Abt Associates is evaluating Pathways to Healthcare as part of the **Pathways for Advancing Careers and Education (PACE)** project. Funded by the Administration for Children and Families (ACF) within the U.S. Department of Health and Human Services, PACE is a multi-site experimental evaluation of nine programs aimed at helping low-income adults to access career pathways. Primary results of the Pathways to Healthcare evaluation can be found in the Three-Year Impact Report (Litwok and Gardiner 2020), which this document refers to as the “main report” and the main appendix volume (Judkins et al. 2020). The main report extended analyses from an earlier implementation and short-term impact report (Gardiner et al. 2017).

This document adds cost information to the evaluation of Pathways to Healthcare by calculating a net cost per treatment group member of Pathways to Healthcare. This is being presented for two reasons. First, should earnings impacts materialize in subsequent quarters of data collection, the cost estimates presented here will serve as the basis for a full cost-benefit analysis.² Second, documenting intervention costs allows future meta-analyses of education and workforce training initiatives to include the intervention costs along with impact estimates in attempts to draw conclusions on the wider body of research evidence.

This appendix is organized as follows. Section I.1 presents the cost of program services and the cost of postsecondary education and training enrollment and then sums the costs to obtain the net costs of Pathways to Healthcare per participant (i.e., treatment group member) from society’s perspective. Section I.2 reports cost information by other stakeholders’ perspectives (participant, federal government, local government, and the rest of society). Section I.3 provides details on the cost analysis methodology.

I.1 Costs of Pathways to Healthcare to Society as a Whole

Exhibit I-1 defines the elements included in the cost analysis. Specifically, for both the treatment and control groups, the cost analysis estimates two primary categories of costs—program

² The estimates are based on data collected during the PACE and Career Pathways Intermediate Outcomes projects. Documenting the costs here puts the estimates on record while the cost data are available and our questions could be addressed with program staff.

services and postsecondary education and training.³ This report focuses on net cost; i.e., the difference in cost between the treatment group and the control group. This focus on net cost is consistent with the impact analysis focus on net impacts on earnings and other outcomes. Net cost is calculated as the **difference** between cost per treatment group member and cost per control group member. Net costs are calculated for each category, and then summed to estimate the net cost per treatment group member of Pathways to Healthcare.

Exhibit I-1: Cost Analysis Elements

Cost Category	Treatment Group	Control Group
Program services	Pathways to Healthcare <ul style="list-style-type: none"> • Pathways-specific advising • Tuition and direct assistance • Program-specific classes • Tutoring • Employment supports 	Alternatives available in the community <ul style="list-style-type: none"> • Standard PCOS offerings, including tuition assistance through Individual Training Accounts
Postsecondary education and training enrollment	All enrollment and related services <i>not</i> provided as part of Pathways to Healthcare program services	All enrollment and related services less tuition assistance provided through alternative program services

Program Services

Pathways to Healthcare program services are summarized above in Exhibit I-1 and discussed in detail in Chapter 1 of the main report. Aggregating the costs of these services, **the cost per treatment group member of Pathways to Healthcare program services was \$3,684** (see Exhibit I-2). During the study period, the Pathways to Healthcare program was primarily funded through the Health Profession Opportunity Grants (HPOG) demonstration, a grant program of the Administration for Children and Families, within the U.S. Department of Health and Human Services.⁴

Exhibit I-2: Costs of Program Services

Program Service	Cost of Program Service
Cost per treatment group member of Pathways to Healthcare (\$)	3,684
Cost per control group member of alternative services available in the community (\$)	1,195
Net cost of Pathways to Healthcare program services (\$)	2,489

Source: Program financial records, PACE three-year follow-up survey, analysis team research and assumptions.

^a Program service costs include tuition assistance and other enrollment costs that are also considered part of postsecondary education and enrollment. The tuition assistance and enrollment costs included in program services costs are broken out in Exhibit I-3.

³ Costs reported in this analysis do *not* include indirect costs to participants of program participation, most notably, foregone earnings (since participation implies lower concurrent levels of employment). See Chapter 5 of Litwok and Gardiner (2020), especially Exhibit 5-2, for an analysis of earnings over the full follow-up period.

⁴ Further detail on HPOG funding of the Pathways to Healthcare program is included in Gardiner et al. (2017).

The cost analysis used financial records provided by Pathways to Healthcare staff to identify the resources and associated costs used to provide these program services. The program services cost can be grouped into high-level categories. The share of total cost for these categories are as follows:

- *53 percent:* PCC support staff—instructors for dedicated program courses, student support and services specialists, program coordinators, and tutors—and PCOS support activities;
- *17 percent:* Direct program assistance costs—tuition and assistance for education-related expenses such as books, licensure, exam fees, and occasional emergency assistance for help with barriers to training, such as rent, utilities, and car payments; and
- *29 percent:* Indirect costs—facilities, college administration—and program administrative staff costs.

Although embargoed from accessing Pathways to Healthcare program services, control group members could receive services in the community that were similar to some of the elements of Pathways to Healthcare. The cost of such services is estimated to be \$1,195 per control group member (second row of Exhibit I-2).⁵ The final row of Exhibit I-2 shows the calculated ***net cost of Pathways to Healthcare program services of \$2,489 per treatment group member***. This is the difference between cost per treatment group member and cost per control group member for program services.

Postsecondary Education and Training Enrollment

As intended, Pathways to Healthcare increased the amount of postsecondary education and training that treatment group members obtained relative to the control group (see Exhibit I-6). This led to postsecondary enrollment costs that were higher for treatment group members.

The last row of Exhibit I-3 reports the estimated cost of all postsecondary education and training enrollment obtained by treatment and control group members. **The Pathways to Healthcare program increased the costs of all enrollment in college for the treatment group relative to the control group by \$583 per participant.**⁶

This estimate includes enrollment at PCC for treatment group members that is part of participation in the Pathways to Healthcare. That is, costs of enrollment at PCC that were incurred by the Pathways to Healthcare program, such as tuition assistance and academic advising.⁷ This cost is \$1,358 per treatment group member. Some Pathways to Healthcare program services replaced some mainstream postsecondary education and training services

⁵ Section I-3 explains how this cost was estimated.

⁶ Exhibit I-6 builds up these calculations.

⁷ These services are dedicated Nursing Assistant and College Readiness courses, academic advising, tuition assistance, and some tutoring. Similarly, control group members receive tuition assistance as part of alternative program services available in the community.

that are included in the cost estimates for postsecondary enrollment. Accounting for this overlap, treatment group members incurred \$537 lower costs of postsecondary education and training enrollment that is not provided as part of Pathways to Healthcare (second row of Exhibit I-3).

Exhibit I-Error! No text of specified style in document.3: Costs of Postsecondary Education and Training Enrollment

	Treatment Group	Control Group	Net Cost
Enrollment provided as part of program services (\$) ^a	1,358	238 ^c	1,120
Postsecondary education and training enrollment (<i>not</i> provided as program services) (\$) ^b	5,004	5,541	537
All postsecondary education and training enrollment (\$) ^b	6,362	5,779	583

Source: Main report Exhibit 4-4, IPEDS data.

^a These costs were also included in the program service costs in Exhibit I-2. As detailed in Section I-3, this includes part of the PCC support staff costs (instructor salaries, two-thirds of academic advising costs, and half of dedicated tutor costs) and part of the direct program assistance costs (tuition assistance) for treatment group members.

^b Includes postsecondary education and training enrollment during the first three years after random assignment.

^c This cost reflects tuition assistance provided by PCOS or other programs in the community to control group members. Control group members assumed to receive half as much tuition assistance from these programs as treatment group members receive from Pathways to Healthcare.

Total Net Costs of Pathways to Healthcare

Exhibit I-4 reports the main findings of the cost analysis, summing the net costs for each category reported above to calculate the total net cost of Pathways to Healthcare. **The total net cost of Pathways to Healthcare to society was \$1,952 per treatment group member.** The total net cost is the difference between the per-treatment and per-control group member costs of program services and postsecondary education and training enrollment costs. Measured in terms of monetized costs and compared to other cost analyses of workforce training programs, the Pathways to Healthcare was a relatively modest, low-intensity intervention.⁸ This reflects both a relatively low program cost per treatment group member and a relatively high cost of similar services accessed by control group members.

⁸ A 2003 meta-analysis of 15 government-sponsored youth training programs reported an average cost of \$12,479 (with a standard deviation of \$5,728) (Greenberg et al. 2003). A recent study of the relatively low-intensity, national WIA and Workforce Innovation and Opportunity Act programs found per-person costs ranging from \$1,127 (core program) to \$2,376 (full program) (Fortson et al. 2017). Average costs for other sectoral training programs were \$11,156 for Project QUEST (Roder and Elliot 2019) and \$6,231 to \$7,929 for programs studied in the WorkAdvance demonstration (Hendra et al. 2016). Estimates for more intensive youth programs include \$19,824 for YouthBuild (Cohen and Piquero 2015), \$24,703 for Job Corps (Schochet et al. 2006 and Greenberg et al. 2003), and \$14,864 for the National Guard Youth ChalleNge program (Perez-Arce et al. 2012). Figures adjusted for inflation to 2014 dollars.

Exhibit I-Error! No text of specified style in document.4: Pathways to Healthcare Costs per Participant

Cost Category	Cost per Treatment Group Member	Cost per Control Group Member	Net Cost (Treatment – Control)
Program services ^a (\$)	3,684	1,195	2,489
Postsecondary education and training enrollment (not provided as program services) ^b (\$)	5,004	5,541	-537
Total Cost (\$)	8,688	6,736	1,952

Source: Program financial records, survey responses, analysis team research and assumptions, main report Exhibit 4-4, IPEDS data

^a Program services costs are for Pathways to Healthcare for the treatment group and for approximated access to alternative services for the control group.

^b Includes postsecondary education and training enrollment during the first three years after random assignment. Excludes costs of services provided as part of program services. As detailed in Section I-3, this includes part of the PCC support staff costs (instructor salaries, two-thirds of academic advising costs, and half of dedicated tutor costs) and part of the direct program assistance costs (tuition assistance) for treatment group members.

I.2 Costs by Stakeholder Perspective and Calculation of Postsecondary Education and Training Costs

This section provides additional detail on costs estimates by stakeholder perspective and the calculation of postsecondary education and training costs.

The cost analysis' primary focus is costs of Pathways to Healthcare to society as a whole. However, costs calculated from various stakeholders' perspectives are also often of interest to policymakers and researchers, so this cost analysis also reports costs from the perspective of the participant, the federal government, the Arizona state and local governments, and the rest of society.⁹

Exhibit I-5 reports how the costs of Pathways to Healthcare accrue by stakeholder perspective. Despite having higher enrollment, the total cost per treatment group members is lower than for control group members (total net cost is -\$579). This is because treatment group members received more tuition assistance (i.e., Pell Grants and Pathways to Healthcare tuition assistance) than control group members obtained from other programs available in the community. The federal government's net cost of Pathways to Healthcare is \$2,623. Costs to state and local governments and the rest of society are essentially the same for treatment and control group members, as PCC enrollment via Pathways to Healthcare shifts some of the treatment group member costs from PCC's funders to the federal government. This is because use of PCC enrollment-related services normally covered by state and local governments are partially displaced by Pathways to Healthcare program services that are entirely federally funded through the HPOG demonstration.

⁹ The cost to the society as a whole is the sum of the costs for the four stakeholder perspectives.

Exhibit I-Error! No text of specified style in document.5: Net Costs of Pathways to Healthcare by Perspective

Component	Participants	Government, Federal	Government, State/Local	Rest of Society	Society as a Whole (sum)
Pathways to Healthcare services (\$)	0	2,489	0	0	2,489
Postsecondary education and training (\$)	-579	134	-69	-23	-537
Total Net Cost (\$)	-579	2,623	-69	-23	1,952

Source: Integrated Postsecondary Education Data System (IPEDs) data, cost study team research using archived versions of Caregiver Institute website and tax forms, Exhibit I-1.

As detailed in Section I-3, postsecondary education and training costs are the unit costs of enrollment for those enrolled (Exhibit I-9) multiplied by the quantity of enrollment implied by postsecondary education and training impact estimates from Chapter 4 of the main report. Exhibit I-6 builds up the cost estimates from these underlying parameters. FTE (full-time-equivalent) months enrolled in college increased by 0.75 months due to Pathways to Healthcare. At a unit cost of \$945, this results in costs of enrollment that are \$708 higher for the treatment group relative to the control group. Similarly, impact estimates imply that FTE months enrolled in non-college schools decreased by 0.05 months, which implies costs that are \$125 lower for the treatment group than the control group. Together, this results in a net cost of all postsecondary enrollment of \$583, which is shown here and was reported in Exhibit I-3.

Exhibit I-6: Costs of all Postsecondary Education and Training Enrollment

Outcome	Treatment Group	Control Group	Impact (Difference)
<i>FTE (full-time-equivalent) months enrolled in college (#)</i>	5.41	4.66	+0.75**
Implied cost (\$945 per FTE month) (\$)	5,112	4,404	708
<i>FTE months enrolled in any school (#)</i>	5.91	5.21	+0.70
Implied FTE months enrolled in non-college school	0.5	0.55	-0.05
Implied cost (\$2,500 per FTE month) in non-college school (\$)	1,250	1,375	-125
Total implied cost (\$)	6,362	5,779	583

Source: Main report Exhibit 4-4; IPEDS data for PCC; cost analysis study team research.

Note: Impact findings from Chapter 4 of main report in italics. FTE (full-time-equivalent months) enrolled in college is a secondary outcome, with statistical significance based on a one-tailed test; FTE months enrolled in any school is an exploratory outcome, with statistical significance based on two-tailed tests.

Statistical significance levels based on differences between research groups: *** 1 percent level; ** 5 percent level; * 10 percent level.

I.3 Cost Analysis Method

This section describes our approach to estimating the per-participant cost of Pathways to Healthcare. There are two categories of costs: program services and postsecondary education and training enrollment, defined for the treatment and control group in Exhibit I-1 above. Total costs are calculated by summing the categories while accounting for overlapping services that contribute to cost estimates within both categories. Equation I1 summarizes the calculation detailed in this section.

$$\begin{aligned} \text{Total net cost of Pathways to Healthcare} = & \\ & \text{net cost of program services} + \\ & \text{net cost of postsecondary education and training enrollment} \end{aligned} \quad (\text{Equation I1})$$

Net costs for each category are calculated as the difference between the cost estimated for the treatment group and for the control group. Some costs are measured directly (e.g., cost per treatment group member of Pathways to Healthcare program services measured using program expenditure data). Other costs are approximated (e.g., cost of control group use of alternative program services available in the community). As discussed below, the cost analysis uses a variety of approximation approaches to estimate costs that are not directly observed.

Program Services

For treatment group members, program service costs include the financial assistance, instructional services, and other support services the Pathways to Healthcare program provided. The middle column of Exhibit I-7 lists the elements of Pathways to Healthcare available to treatment group members only.¹⁰ The cost of Pathways to Healthcare program services per treatment group member includes all of these elements.

Costs of program services provided to the treatment group are estimated based on financial records from PCC and PCOS, augmented with cost data collected via telephone interviews conducted in 2015.¹¹

Control group members could access some program services elsewhere in the community that were similar to those received by treatment group members from Pathways to Healthcare, including from PCC and PCOS mainstream offerings. As shown in the right column of Exhibit I-7, examples include accessing mainstream academic advising and tutoring from PCC (without receiving specialized advising on the career pathway mapping that was part of Pathways to Healthcare) and receiving standard employment services from PCOS (which could include tuition assistance through Individual Training Accounts).

Exhibit I-7: Comparison of Career Pathways Components Available to PACE Control Group and Treatment Group Members

Program Services Element	Pathways to Healthcare Elements Available to Treatment Group Only	PCC and PCOS Services Available to Control Group
Assessment	<ul style="list-style-type: none"> Assessment of goals and barriers to program participation and success 	<ul style="list-style-type: none"> TABE testing at PCOS ACT Compass testing at PCC

¹⁰ The exhibit presents the information original in Exhibit 3-1 from Section 3.1.3 of Pathways to Healthcare Program: Implementation and Early Impact Report (Gardiner et al. 2017).

¹¹ This was after the program had been operating for a few years so that expenditure-based cost data was available, but while staff administering the program and grant were still available to answer research team questions about the data.

Program Services Element	Pathways to Healthcare Elements Available to Treatment Group Only	PCC and PCOS Services Available to Control Group
Curriculum	<ul style="list-style-type: none"> Accelerated basic skills College Readiness class or open lab for those who do not test into their training of choice Organization of the 16 programs into five pathways Dedicated Nursing Assistant program 	<ul style="list-style-type: none"> Basic skills education at PCC or other community locations 16 occupational training programs
Supports	<ul style="list-style-type: none"> Two dedicated PCC academic advisors Dedicated PCOS advisor to assist with identifying and addressing barriers Instructional supports (study groups, program readiness classes, tutoring) Follow-up support after program completion Tuition scholarship Other support services (e.g., uniforms, transportation vouchers, licensure testing) 	<ul style="list-style-type: none"> Academic advising through the PCC student service center and/or PCC Center for Training and Development PCC tutoring services Financial aid based on eligibility and availability (e.g., Pell grants, Individual Training Accounts through PCOS)
Employment Services	<ul style="list-style-type: none"> PCOS employment supports Program-specific employment specialist Program-specific workshops Networking group 	<ul style="list-style-type: none"> Standard employment services from PCOS

Source: Program documents and site visits. Reproduction of Exhibit 3-1 of Gardiner et al. (2017).

Relatively little data are available to estimate the costs of services used elsewhere in the community by control group members.¹² Lacking detailed data, the study team approximated costs of control group access to alternative services. Specifically, we assume multipliers for control group costs as a percentage of treatment group costs for specific program service elements. The multiplier is based on the rates of control and treatment group service receipt reported in the PACE surveys. These multipliers are then applied to line items (adjusted to a per-participant basis) for those elements in Pathways to Healthcare program financial records. The resulting amounts for these elements are then summed to approximate program services cost per control group member. Services obtained through mainstream postsecondary education and training enrollment (e.g., all items provided by PCC in the right column of Exhibit I-7) are included in the next cost category, and do not need to be approximated here. For similar program services that control group members could receive outside of mainstream postsecondary education and training offerings, the cost analysis assumes the following:

- The cost of control group use of PCOS advising services was 60 percent of PCOS costs of providing Pathways to Healthcare program services to the treatment group.* Exhibit I-8 reports the detail on which this approximation is based. Control group individuals received career counseling, help arranging supports for school/work/family, and job

¹² Baseline and follow-up survey data provide some indication of the *types* of services control group members accessed, but not the *sources or intensity* of these services.

search or placement assistance at between 52 and 68 percent the rate that treatment group members did.

- *The cost of direct financial supports and tuition assistance received by the control group from other programs in the community was 50 percent of costs observed for the treatment group in Pathways to Healthcare financial records.* For direct financial supports, this assumption is motivated by the finding that control group members reported receiving help arranging supports for school/work/family at roughly half the rate of the treatment group. For the tuition assumption, the analysis is motivated by study team institutional knowledge about the availability of tuition and fee assistance outside of mainstream postsecondary education and training financial assistance (which is captured in the next category). The primary source for such assistance at this time was Individual Training Account funds administered by PCOS, but study team members that conducted the implementation evaluation indicated that such funds were limited at the time control group members received mainstream PCOS services.

Any other services and supports received by the control group are assumed to be provided by PCC or other education and training institutions, and so are included in postsecondary education and training costs.

The final program services cost is calculated as the **difference** between the cost of Pathways to Healthcare program services per treatment group and the cost of alternative program services per treatment group member.

Exhibit I-8: Receipt of Various Supports since Random Assignment and Cost Analysis Assumptions

Received assistance from any organization since random assignment	Treatment Group	Control Group	Control Group Percent of Treatment Group
Career counseling (%)	27.5	18.7	68
Help arranging supports for school/work/family (%)	14.0	7.3	52
Job search or placement (%)	23.3	14.1	61
Sample size (full survey sample)	500	477	

Source: Exhibit 4-11 of Gardiner et al. (2017).

Note: Treatment and control group means are from impact models (i.e., regression-adjusted).

Postsecondary Education and Training Enrollment

The second cost category, **postsecondary education and training enrollment**, includes the costs of participants' enrollments, whether obtained at PCC or other postsecondary education and training institutions. All postsecondary education and training is included because, as discussed in the main impact report, the career pathways theory of change as applied to the program (Exhibit 2-1 of the main report) implies an increase in postsecondary education and training. The intervention is hypothesized to both directly increase hours of training and increase future training along a healthcare career pathway. Both of these effects suggest greater costs of

postsecondary education and training for treatment group members relative to control group members.

The cost of postsecondary education and training enrollment is calculated as the product of a *quantity* measure of units of education and training received and a *unit cost* of the education and training. The net cost is the impact estimate for quantity (the difference between treatment and control group quantity) multiplied by a unit cost of the education and training.

To measure quantity of enrollment and differences in quantity of enrollment, this analysis uses impacts from Section 4.2 of the main report. Specifically, the analysis uses the secondary outcome of FTE (full-time equivalent) months enrolled in college, supplemented by the exploratory outcome of FTE months enrolled at any school. The analysis approximates enrollment at non-college institutions as the difference between the estimate of FTE months enrolled in any school and FTE months enrolled in college.¹³

The analysis applies two unit cost estimates based on estimated cost at two representative institutions; the first is for FTE months enrolled in college and the second is for FTE months enrolled at non-college institutions. Exhibit I-9 details the unit cost estimates and additional financial variables used in the perspective analysis reported in Section I-2. As an estimate for unit costs of college enrollment—regardless of who paid the costs—the analysis uses the cost per FTE month enrolled at PCC. This estimate comes from Integrated Postsecondary Education Data System (IPEDS) data. Variables from IPEDS used in the cost analysis include per-student expenditures, revenue shares by type, enrollment, and student aid (including Pell grants). Cost per FTE month is estimated from these variables following definitions used in the Delta Cost Project Database (Hurlburt et al. 2017).¹⁴ Because enrollment at PCC comprises over 85 percent of college enrollment by study participants, PCC unit costs represents a good proxy for unit costs of enrollment at any college.¹⁵

To estimate the cost of enrollment at non-college institutions, the study team conducted web research to develop a cost estimate for the most-attended non-college institution, the Caregiver Institute. Reviews of offerings at the time study participants would have enrolled, annual reports,

¹³ As described in Chapter 2 of the main report, PCC records are the chief data source for education outcomes in the report. These records measure participation in education and training at PCC for both the treatment and control groups. They were checked against NSC records and adjusted for differences and augmented by survey responses reporting training at institutions not represented by PCC or NSC records (e.g., private, short-term training providers). Section 2.3 and Appendix B of the main report provide extensive details about these sources.

¹⁴ The PCC unit cost estimate used is a five-year average of inflation-adjusted costs from 2011-2015.

¹⁵ The 85 percent estimate is based on PACE three-year follow-up survey responses. The costs of postsecondary education and training results are robust (i.e., qualitatively similar) to using an alternative unit cost of college enrollment estimate of the weighted average of unit costs for institutions that participants report attending, where the weights are based on the FTE months enrolled at each institution.

and financial reports were used to develop an estimate of FTE month costs at this institution, reported in the second row of Exhibit I-9.¹⁶

Exhibit I-9: Unit Costs of FTE Month Enrollment

Enrollment Type	Representative Institution	Cost per FTE Month Enrolled	PACE Participant Estimated Out-of-Pocket per FTE Month Enrolled	Institution Revenue Share			
				Net Tuition/ Fees	Federal	State/ Local	Other
College	Pima Community College	\$945	-\$412	1.5%	32.0%	66.7%	0.8%
Non-college	Caregiver Institute	\$2,500	\$2,068	82.7%	0%	0%	17.3%

Source: Integrated Postsecondary Education Data System (IPEDs) data, cost study team research using archived versions of Caregiver Institute website and tax forms.

To understand which stakeholders bear the costs of enrollment, the analysis also estimates costs to students and each of PCC's funders in addition to the total cost per FTE month enrolled. Student costs are measured as PACE participant out-of-pocket costs per FTE month enrolled. Costs to PCC's funders are estimated based on the share of PCC's revenue from tuition/fees (e.g., other students), the federal government, state/local governments, and other sources. PACE participant out-of-pocket costs are negative because Pell grant amounts for which students are eligible exceed tuition and fees.

The analysis estimates postsecondary education and training enrollment cost by multiplying the unit cost estimates in Exhibit I-9 by enrollment quantities reported in Chapter 4 of the main report.¹⁷

Overlapping services

Pathways to Healthcare is operated by PCC in a community college setting. Treatment group members receiving program services are concurrently enrolled as PCC students, and program services overlap to some degree with mainstream services provided by PCC. Examples include Nursing Assistant and College Readiness courses, academic advising, tuition assistance, and some tutoring. The mainstream services analogs of these program services are included in the PCC enrollment costs. The cost analysis assumes that the services and courses that treatment group members receive through the Pathways to Healthcare program displace, to varying degrees, mainstream PCC support services and courses associated with standard (i.e. non-Pathways to Healthcare) enrollments. As such, the costs of these services should not be

¹⁶ Approximately 40 percent of non-college enrollment is at the Caregiver Institute. However, the impact estimates in Chapter 4 indicate a very small enrollment difference (0.05 month) between treatment and control group. So the unit cost estimate in non-college enrollment is not material to conclusions in the cost analysis.

¹⁷ Training costs in later years are discounted to the time of random assignment using a discount rate of 3 percent to account for the time value of money. This value assumes that \$1 at random assignment is valued equivalently to \$1.03 a year later. See Dastrup, Burnett, and Buron (2017) for further motivation.

counted twice—as both program service costs and costs of postsecondary education and training enrollment—when summing up to the total cost of Pathways to Healthcare. This is accomplished by subtracting an estimate of overlapping costs from estimated costs of all postsecondary education and training enrollment when calculating the costs of postsecondary education and training enrollment not provided as program services. The resulting cost measure is what is included in Equation I1 at the beginning of this section and shown in Exhibit I-3.

The Pathways to Healthcare program services costs per treatment group member that are assumed to displace mainstream PCC services are:

- *Two-thirds of itemized costs for the dedicated PCC academic advisors.* This multiplier is the study team's best approximation based on a comparison of the incidence and intensity of service receipt by treatment and control group members reported in the "received supports at first place of instruction attended" items in Exhibit 4-11 of Gardiner et al. (2017).
- *The entire cost of dedicated faculty instructors for two program-specific courses (Nursing Assistant and College Readiness).* The entire cost is included as overlapping because the full cost of a course's instructor would otherwise be included in the cost of postsecondary enrollment.
- *Half the cost of dedicated tutors.* This multiplier is a best estimate based on both the survey-reported tutoring receipt (Exhibit 4-11 of Gardiner et al. 2017), and the description of more intensive (e.g., individual) tutoring receipt provided by Pathways to Healthcare relative to mainstream PCC offerings in Gardiner et al. (2017).

Similarly, some control group access to services available in the community can include supports that overlap with training costs. Specifically, as noted above, the analysis assumes control group members received half as much tuition assistance from other organizations in the community (notably, Individual Training Account funds from PCOS) to assist with tuition and fees for education and training as do treatment group members. Any other program services are assumed to be provided by postsecondary education and training institutions (e.g., PCC), and as such, included in postsecondary education and training enrollment costs without overlap.

The analysis of costs by stakeholder also adjusts the incidence of postsecondary education and training enrollment costs to reflect these overlapping services. Specifically, the costs of the overlapping services are allocated to the federal government (because the federal government funded Pathways to Healthcare through the HPOG demonstration), and away from the state and local governments and other stakeholders proportionally to the institution revenue shares reported in Exhibit I-9. The shift in costs to the federal government results in net savings to other stakeholders.

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